

ADDENDUM; Service Manual, MX5000 & MX7000 (Part No. O300-1392-700; 5-85)

This addendum should be considered as a continuation of Section 3 (Maintenance) of the Service Manual. It contains replacement parts lists for MX7000. The arrangement is as follows:

CPU PCB Assembly Table 3-6

Main PCB Assembly Table 3-7

NOTE: The PLL PCB Assembly (Table 3-3) is common to MX5000 and MX7000.

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CPU PCB Assembly Table 3-6

Main PCB Assembly Table 3-7

NOTE: The PLL PCB Assembly (Table 3-3) is common to MX5000 and MX7000.

Table 3-6. Replacement Parts List, CPU PCB Assy; MX7000. See Fig. 3-10.

ITEM REFERENCE DESIGNATION	PART NUMBER	DESCRIPTION
C1	9999-5000-052	Capacitor, El.; 100uF; 6.3V
C2	9999-0650-053	Capacitor, El.; 1uF; 50V
C3, 8	9999-1000-093	Capacitor, Cd.; 33pF; 50V
C4-6	9999-1000-098	Capacitor, Cd.; 0.01uF; 50V
C7	9999-0604-112	Capacitor, Cd.; 10pF
C9	9999-1000-114	Capacitor, El.; 0.1uF; 50V
D4-B	9999-0604-006	Diode
IC1	9999-5000-237	IC; uPD750
L1, 2	9999-5000-156	Coil, RF
L5	9999-5000-157	Coil, RF
NOTE: All Resistors are 1/8W		
R5, 7-10, 14, 21,	4704-0104-031	Resistor, Carbon; 100K Ohm
R6	4704-0154-031	Resistor, Carbon; 150K Ohm
R12, 13, 20	4704-0103-031	Resistor, Carbon; 10K Ohm
R15-17, 19	4704-0224-031	Resistor, Carbon; 220K Ohm
R18	4704-0334-030	Resistor, Carbon; 330K Ohm
R12, 25, 30	4704-0473-031	Resistor, Carbon; 47K Ohm
R24	4704-0101-031	Resistor, Carbon; 100 Ohm
R29	4704-0100-031	Resistor, Carbon; 10 Ohm
TC-1	9999-1000-046	Trimmer Capacitor; Ceramic; 20pF
X1	9999-5000-202	Crystal, 32.768 KHz

Table 3-7. Replacement Parts List, Main PCB Assy; MX7000. See Fig. 3-8.

ITEM REFERENCE DESIGNATION	PART NUMBER	DESCRIPTION
C1,2, 85, 86, 90	9999-1000-094	Capacitor, Cd.; 47pF; 50V
C4, 6, 137	9999-0604-108	Capacitor, Cd.; 1pF
C5, 9	9999-1000-090	Capacitor, Cd.; 7pF; 50V
C7, 11, 56, 83, 129	9999-0604-111	Capacitor, Cd.; 5pF
C8, 13, 14, 16, 22, 23, C28-30, 32, 35, 40, 55, C58, 64, 70, 72, 75, 76 C79, 89, 92, 130, 132, 138 C139	9999-1000-097	Capacitor, Cd.; 0.001uF; 50V
C10, 59, 61	9999-0604-112	Capacitor, Cd.; 10pF
C12, 15, 50, 52, 54	9999-0604-114	Capacitor, Cd.; 15pF
C17, 39, 41, 42, 62, 71, C74, 84, 97, 106 109-112, C124, 131, 133	9999-1000-098	Capacitor, Cd.; 0.01uF; 50V
C18, 20, 135	9999-0604-109	Capacitor, Cd.; 2pF
C19	9999-0604-110	Capacitor, Cd.; 3pF
C21, 24-26, 31, 44, 60, C63, 65, 66, 69, 73, 78	9999-5000-055	Capacitor, Cer.; 20pF
C27, 88	9999-1000-093	Capacitor, Cd.; 47pF; 50V
C33	9999-1000-100	Capacitor, El.; 2.2uF; 50V
C34, 36, 46, 48, 94, 98, C102, 104, 108, 113, 127	9999-1000-114	Capacitor, El.; 0.1uF; 50V
C37-39	9999-0650-054	Capacitor, El.; 10uF; 16V
C43, 51, 77	9999-5000-056	Capacitor, Cer.; 24pF
C45, 49, 87	9997-0900-086	Capacitor, Cer.; 100pF
C47	9999-1000-096	Capacitor, Cd.; 150pF; 50V
C53, 67, 68	9999-1000-089	Capacitor, Cd.; 0.5pF; 50V
C57	9999-0604-113	Capacitor, Cd.; 12pF
C80, 81, 91, 96, 100, 101	9999-5000-058	Capacitor, Cer.; 0.022uF
C82	9999-1000-092	Capacitor, Cd.; 27pF
C95, 99, 103, 107, 116, C125	9999-0650-053	Capacitor, El.; 1uF; 50V
C105	9999-5000-057	Capacitor, Cer.; 0.0047uF
C114, 121	9999-5000-052	Capacitor, El.; 100uF; 6.3V
C115	9999-0650-055	Capacitor, El.; 220uF; 16V
C122, 136	9999-1000-052	Capacitor, El.; 100uF; 10V
C123	9999-1000-064	Capacitor; 4.7uF; 35V
C126	9997-5000-148	Capacitor, El.; 100uF; 16V

Table 3-7 . . . Continued

ITEM REFERENCE DESIGNATION	PART NUMBER	DESCRIPTION
D1, 6-11, 14-17, 19-22	9999-0604-006	Diode
D2, 3, 23-29	9999-5000-251	Diode; BA282
D13	9999-5000-253	Diode; 48701-3P
D18, 30	9999-5000-254	Diode; ISS97
IC1	9999-5000-238	IC; MC5800
IC2	9999-5000-239	IC; NIS-110A
IC3	9999-5000-240	IC; NIS-112A
IC6	9997-5000-044	IC; TA78L006AP
IC7	9999-5000-241	IC; UA7806
IC8	9999-5000-242	IC; UPC2002
Q1	9999-1000-070	Transistor, FET
Q2, 6, 9, 17, 18, 20, 21, Q25, 26, 28, 29, 34-36, Q38	9999-5000-261	Transistor; 2SC2785
Q3, 12, 13, 37	9999-5000-260	Transistor; 2SC3355
Q4, 5, 8, 14-17, 51	9999-5000-262	Transistor; 2SC2787
Q7, 22-24, 27, 33, 45, 46, Q48	9999-5000-263	Transistor; 2SA1175
Q10, 11	9999-5000-266	Transistor; 2SC2786
Q19	9999-5000-264	Transistor; 2SK68
Q32	9999-5000-265	Transistor; 2SD288
NOTE: All Resistors are 1/8 W		
R1, 5, 131, 138	4704-0101-031	Resistor, Carbon; 100 Ohm
R2, 3, 44, 46, 75, 144	4704-0104-031	Resistor, Carbon; 100K Ohm
R4, 68, 115, 125, 134, R141	4704-0100-031	Resistor, Carbon; 10 Ohm
R6, 7, 18, 24, 74, 84, R101, 119, 120, 126, 146	4704-0473-031	Resistor, Carbon; 47K Ohm
R8, 145	4704-0470-031	Resistor, Carbon; 47 Ohm

Table 3-7 . . . Continued

ITEM REFERENCE DESIGNATION	PART NUMBER	DESCRIPTION
R9, 13, 14, 16, 38, 41, 45, R47, 50, 51, 53, 54, 64, R71, 78, 137	4704-0102-031	Resistor, Carbon; 1K Ohm
R10, 11, 37, 58, 59, 66, R69, 77, 79, 93, 94, 96, R99, 100, 102, 105, 122, R124, 129, 135, 142	4704-0103-031	Resistor, Carbon; 10K Ohm
R12, 20, 22, 29, 48, 72, R82, 83, 90, 104	4704-0472-031	Resistor, Carbon; 4.7K Ohm
R15, 21, 26, 28, 30, 36, R39, 42, 49, 52, 57, 63, R65, 67, 87, 98, 121, 143	4704-0224-031	Resistor, Carbon; 220K Ohm
R17, 31, 55	4704-0183-031	Resistor, Carbon; 18K Ohm
R23	4704-0474-031	Resistor, Carbon; 470K Ohm
R25, 35, 85	4704-0152-031	Resistor, Carbon; 1.5K Ohm
R27, 29, 139	4704-0153-031	Resistor, Carbon; 15K Ohm
R32, 33, 40, 56, 91	4704-0222-031	Resistor, Carbon; 2.2K Ohm
R34, 60	4704-0583-031	Resistor, Carbon; 56K Ohm
R43, 81	4704-0221-031	Resistor, Carbon; 220 Ohm
R61	4704-0122-031	Resistor, Carbon; 1.2K Ohm
R62, 108	4704-0332-031	Resistor, Carbon; 3.3K Ohm
R70, 109	4704-0562-031	Resistor, Carbon; 5.8K Ohm
R73, 95, 97, 106, 107, R136	4704-0223-031	Resistor, Carbon; 22K Ohm
R76	4704-0682-031	Resistor, Carbon; 6.8K Ohm
R80, 132	4704-0683-031	Resistor, Carbon; 68K Ohm
R86	4704-0273-031	Resistor, Carbon; 27K Ohm
R89, 92, 104	4704-0471-031	Resistor, Carbon; 470 Ohm
R103, 123	4704-0339-031	Resistor, Carbon; 3.3 Ohm
R127, 128, 130	4704-0333-031	Resistor, Carbon; 33K Ohm
T1, 4-8, 15-18	9999-5000-150	Coil, RF
T2	9999-5000-155	Coil, RF
T3	9999-5000-153	Coil, RF
T9	9999-5000-154	Coil, RF
T10-12	9999-5000-151	Coil, RF
T13, 14	9999-5000-152	Coil, RF
T19, 20	9999-5000-161	Coil

Table 3-7 . . . Continued

ITEM REFERENCE DESIGNATION	PART NUMBER	DESCRIPTION
VR3	9999-5000-296	Resistor, Variable; 10K Ohm
X1	9999-5000-203	Crystal, 46.998 MHz
X2	9999-5000-204	Crystal, 44.575 MHz
X3	9999-5000-205	Crystal, 44.570 MHz
X4	9999-5000-206	Crystal, 39.530 MHz
	9999-5000-315	Connector, 2 Pin; Male
	9999-5000-316	Connector, 3 Pin; Male; Qty. 2
	9999-5000-317	Connector, 6 Pin; Male; Qty. 2
	9999-5000-318	Connector, 7 Pin; Male
	9999-5000-321	Jack
	9999-5000-210	Filter; MCF
	9999-5000-211	Filter; SFT
	9999-5000-212	Filter; DFU
	9999-5000-213	Discriminator; CDA
	9999-5000-214	Discriminator; CDB

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SECTION

1

INTRODUCTION

1.1 General

MX5000 and MX7000 are state-of-the-art, high-performance, double-conversion, superheterodyne receivers. These 20-channel receivers (hereafter simply referred to as the Receivers) have the following features (identical in all respects except as noted).

1.2 Features

- a. The Receivers provide continuous coverage of frequencies from 25 to 550 MHz (and from 800 MHz to 1300 MHz, MX7000 only).
- b. The operating modes are:
Narrowband FM (NFM), Wideband FM (WFM) and AM.
- c. Injection frequencies are stabilized by a microprocessor-controlled phase lock loop (PLL) and quartz crystals.
- d. Channel frequencies, operating modes and search steps are programmed via the frontpanel keyboard.
- e. The received frequency and other information are displayed on an LCD readout.

1.3 Specifications

Table 1-1 lists the technical specifications of the Receivers.

Table 1-1. Technical Specifications of MX5000/MX7000

FREQUENCY CHARACTERISTICS

Range:

25-550 MHz

CB (AM)	26-28
VHF Low (NFM)	27-50
VHF Amateur (NFM/WFM)	50-54
TV Audio (WFM)	54-88
FM Broadcast (NFM)	88-108
VHF Aircraft (AM)	108-136
Space Research (Various)	136-144
VHF Amateur (NFM)	144-148
VHF High Band (NFM)	148-174
TV Audio (WFM)	174-216
Government (Various)	216-220
VHF Amateur (NFM)	220-225
VHF/UHF Aircraft (NFM)	225-336
Government (Various)	336-406
UHF Government (NFM)	406-420
UHF Amateur (NFM)	420-450
UHF Standard (NFM)	450-470
UHF Extended (NFM)	470-512

800-1300 MHz (MX/000 only)

Land Mobile - conventional and trunked systems	806-825
Cellular Mobile Radio	825-851
Land Mobile - conventional and trunked systems	851-870
Cellular Mobile Radio	870-902
Automatic Vehicle Monitoring (AVM) Systems	902-912
Industrial, Scientific, Medical (ISM)	912-918
Automatic Vehicle Monitoring (AVM) Systems	918-928
Land Mobile - Public Safety, Industrial Land Transportation	928-930
Land Mobile - One Way paging	930-931
Land Mobile	931-947
International (public & aeronautical) Alaska, Hawaii and U.S. possessions, Aural broadcast STL	947-952
International (public) Puerto Rico and Virgin Islands only	952-960
Aeronautical Radionavigation	960-1215
Amateur	1215-1300

Modes of Operation: Narrow FM (NFM)
Wide FM (WFM)
AM

Selection: Manual Keyboard Entry
or
Automatic Search

Increments: 5 kHz; 12.5 kHz; 25 kHz

Stability: ± 10 ppm at ambient temperatures between -10° and $+60^{\circ}\text{C}$ ($+14^{\circ}\text{F}$ and $+140^{\circ}\text{F}$).

Sensitivity: Narrow FM: 1.0uV (12 dB SINAD)
Wide FM: 1.5uV (12 dB SINAD)
AM: 1.5uV (10 dB S/N)

Selectivity: NFM ± 7.5 kHz @ 6 dB
WFM ± 50 kHz @ 6 dB
AM ± 5 kHz @ 6 dB

Readout: To 0.5 kHz on LCD Display

Table 1-1. continued

FREQUENCY-RELATED CHARACTERISTICS

Image and Spurious Rejection:	-50 dB.
Intermodulation:	-50 dB.
Receiver Circuitry:	PLL Synthesizer.
Scan Rate:	5 Channels/Sec.
Search Rate:	1 MHz/6 Sec.
Audio Output:	1 W at 10% Distortion.
Number of Memory Channels:	20

POWER

Operating Voltage:	12-14 VDC.
Protection:	3A Internal Fuse

PHYSICAL

Dimensions:	W	H	D
	5.4"	3.1"	7.9"
	138mm	80mm	200mm
Weight:	2.4 lbs (1.1 Kg)		

ACCESSORIES

Standard:	AC Adaptor (P/N 9014-1480-000)
	DC Cable (P/N 9014-1479-900)
	Telescopic Antenna (P/N 9014-1480-100)
Optional:	Mobil Mount MM-1
	Outdoor Antenna

1.4 Receiver Details (MX5000/MX7000)

Figure 1-1 shows the major components. These consist of:

- a. Front Panel
- b. Main PCB Assembly
- c. PLL PCB Assembly
- d. CPU-LCD PCB Assembly
- e. Rear Panel

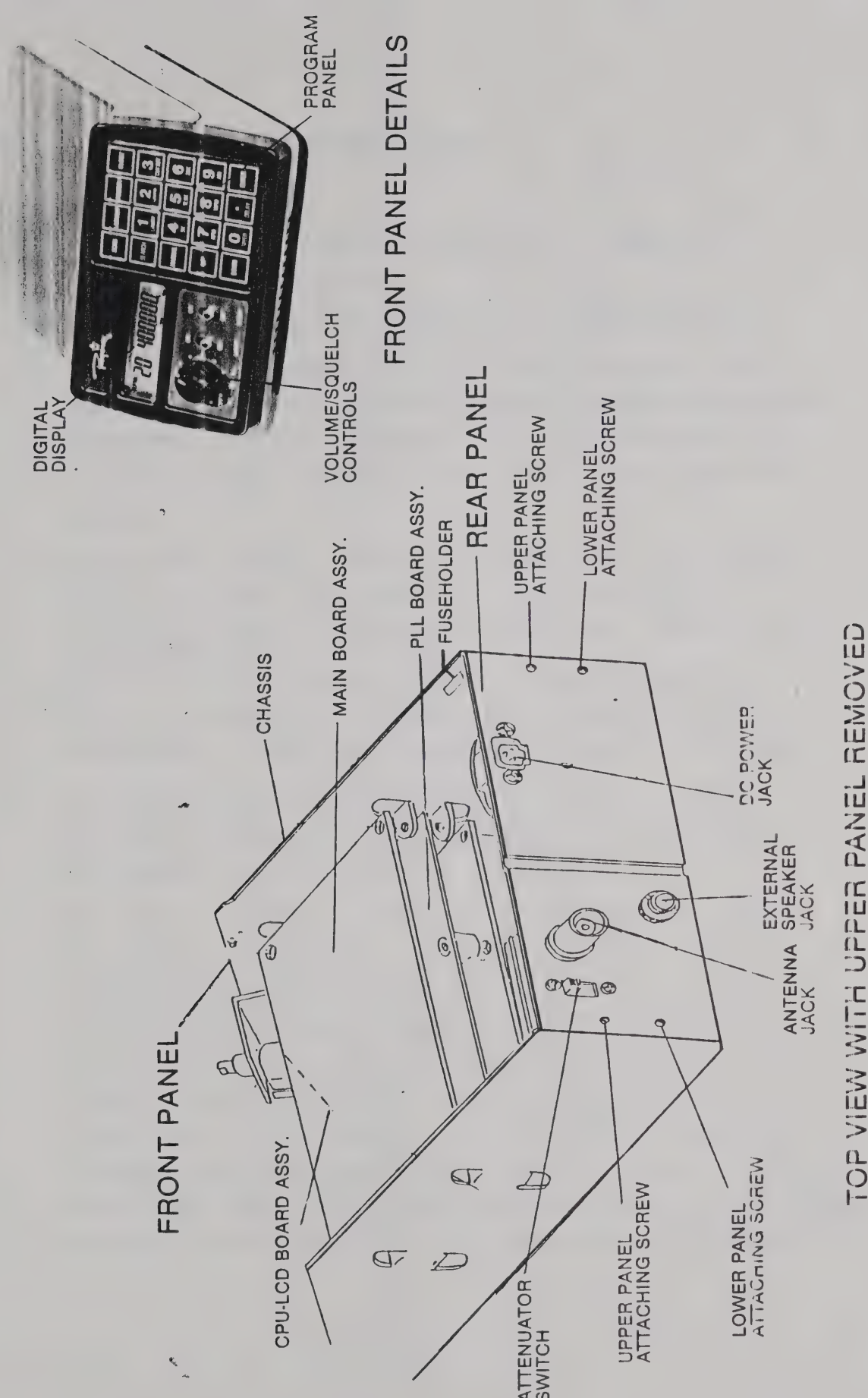


Figure 1-1. Location of Major Components

NOTE: MX5000 and MX7000 are identical in operation except as indicated.

2.1 Operating Principles (See Figure 2-1, Block Diagram)

- a. Signals in the range of 25 to 550 MHz enter the RF amplifier from the antenna through an attenuator and bandpass filter. Protection for the RF amplifier is provided by a diode at the input to the amplifier stage.
- b. Amplified signals from the RF amplifier are mixed in the first mixer with the 1st local oscillator frequency to produce 750 MHz or 45.03 MHz (MX7000) in the 800-1300 MHz band.
- c. The first mixer output passes through a bandpass filter, centered on 750 MHz, and is amplified by two stages of IF amplifiers with AGC circuit on AM mode.
- d. In the 2nd mixer, the 750 MHz IF signal is mixed with 2nd local oscillator frequency of 704.97 MHz to produce 45.03 MHz 2nd IF frequency.
- e. The 2nd IF signal is switched to further IF stages for WFM or NFM/AM. In WFM, the 45.03 MHz signal passes through a bandpass filter and is amplified by a two-stage IF amplifier and converted to a 5.5 MHz 3rd IF by the 39.53 MHz oscillator and amplified/FM detected for further de-emphasis circuit and audio gate. In NFM/AM, the 45.03 MHz signal passes through a pair of monolithic crystal filters, centered on 45.0275 MHz, ± 8 kHz ± 3 dB bandwidth, and is amplified by a two-stage IF amplifier and converted to 455 kHz 3rd

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IF by 44.575 MHz or 44.570 MHz oscillator.

- f. The 455 kHz 3rd IF signal passes through a ceramic filter, centered on 455 kHz, and is switched to further IF amplifiers/detectors for NFM or AM.
- g. The detected signal is gated in an audio gate circuit and amplified by an audio power amplifier to a level of 1 watt.

2.2 Circuit Details (See Schematics, Figure 2-2 and Block Diagram, Fig. 2-1)

Receiver circuitry is built on three principal assemblies: The Main Board; the PLL Board; and the CPU-LCD Board. The PLL Boards for MX5000 and MX7000 are identical in parts and layout. The Main Board and CPU-LCD Boards in the two models differ, the difference being minimal in CPU-LCD Boards.

2.2.1 Main Board Assembly:

- a. The Main board contains the RF amplifier, 1st mixer, 2nd mixer, 2nd local oscillator, bandpass filters, WFM IF circuit, NFM/AM circuit, audio power amplifier, squelch circuit and power control circuits.
- b. The RF amplifier amplifies all signals from 25 to 550 MHz.
- c. The 1st mixer D13 (D30 in MX7000) consists of 4 diodes in a ring configuration as a passive double-balanced mixer which offers high intercept point.
- d. The IF amplifier Q37 (Q31 in MX7000) acts as an impedance matcher and an amplifier. The bandpass filter T-2 consists of triple helical resonators for ± 2 MHz at 35 dB, ± 40 MHz at 65 dB.
- e. The IF amplifier Q1 is a Ga-As FET high gain amplifier, compensating for the insertion loss of T-2. Gain is automatically controlled by Q2 along with Q37.



Figure 2-2. Schematic (Sheet 1 of 2:

- f. The 2nd mixer is an active mixer made up of Q3, a bipolar transistor. The 2nd local oscillator frequency of 704.97 MHz is 15 times 46.998 MHz of the quartz crystal oscillator. Q13 is a power amplifier for 704.97 MHz and its output passes through double helical resonators. In WFM mode, D2 conducts and signal passes through the bandpass filter consisting of T15, T16, T17, then is amplified by Q14, Q15 and is fed into IC-5. For the 800-1300 MHz range (MX7000 only), the output of the first mixer D30 bypasses Q1 and Q13 and is coupled to the junction of D2 and D3. The 704.97 MHz oscillator is disabled.
- g. IC-5 converts signal to 5.5 MHz 3rd IF with its own 39.53 MHz oscillator. It is then amplified and discriminated to audio frequency by the ceramic filter CF3 and discriminator CF4.
- h. In NFM/AM mode, D3 conducts and signal passes through a pair of monolithic crystal filters, is then amplified by Q4, Q5 with AGC control, and is fed to IC-4. IC-4 converts the signal to 455 kHz with its own 44.575 or 44.570 MHz oscillator. The signal is then amplified and discriminated to audio frequency by the ceramic filter CF1 and discriminator CF2. IC-2 is capacitor/resistor network for IC-4 circuit. The squelch circuit works in NFM mode as well as in AM and WFM modes. IC-3 amplifies and detects AM/AGC. Q36 works as a buffer amplifier for AGC and supplies AGC voltage to Q37, Q2, Q4 and Q5. Q6 inhibits 3rd local oscillation in WFM mode. Q7 switches quartz crystal oscillator for proper frequency by 0/5 kHz signal from CPU. The mode switch consisting of 6 transistors, Q22 through Q27, selects/controls preamplifiers Q18 AM, Q21 NFM and Q20 WFM.

- i. The audio level output of each mode is equalized within ± 6 dB tolerance at 1 kHz 60% modulation on AM; 1 kHz modulation 3.5 kHz deviation on NFM; and 1 kHz modulation 25 kHz deviation on WFM. The audio gate circuit consists of IC-6 and Q28, Q29. Two transistors control IC-6 by squelch signal from IC-4 or PLL lock signal from Q15 in PLL unit. The audio power amplifier IC-8 including protection circuit brings enough power output into internal speaker. Beep tone from CPU (ALARM) passes through R137 (1K ohm resistor) to enter IC-8 audio power amplifier. Tone level can be made adjustable if R137 is replaced by a variable resistor of 470K ohm.
- j. The power supply circuit has two output voltages: 6 and 10 volts. IC-7 regulates the 6 volt output and controls the 10 volt regulator consisting of 4 transistors Q32 through Q35. These regulators work also as effective ripple and noise filters.

2.2.2 PLL Board Assembly:

- a. This unit includes the 1st local oscillator in the frequency range of 775-1300 MHz to feed 1st mixer. IC-1 oscillates at 387.5-490 MHz and IC-3 doubles the frequency to 775-980 MHz, IC-2 oscillates at 490-650 MHz and IC-5 doubles the frequency to 980-1300 MHz. IC-1 and IC-2 are voltage-controlled oscillators, and IC-3 and IC-5 are band pass filters. Doubled carrier is buffered by Q5 or Q6, then amplified by Q7, Q8 power amplifier to the output level of 1 milliwatt. VCO outputs via Q1, Q3 are also buffered by Q2, Q4 and passed through IC-4 low pass filter. IC-12 wide band amplifier boosts carrier to enough level to drive IC-6 prescaler. IC-6 is a dual modulus prescaler and forms a pulse swallow

counter in combination with PLL IC-7.

- b. The reference frequency is controlled by quartz crystal oscillator Q9 at 3.200 MHz. It is divided by 128 or 512 in IC-7 internal fixed divider for 25 kHz or 6.25 kHz respectively. IC-9 divides 25 kHz by 5 to 5 kHz. IC-8 switches 5 kHz or 6.25 kHz by 5K/12.5 step signal from CPU.
- c. The output signal from internal tri-state phase detector enters low pass filter Q13, Q14, Q15 which produce VCO control voltage (VCV) in 2-20 volt range. IC-11 is a DC-DC converter for 30 volts. Lock detector circuit consisting of Q10, Q11, Q12, Q16 transfers PLL lock signal to CPU in order to confirm PLL lock completed in each frequency. Q20 cooperates as compensator when lock fails at the initial state by noise mixing in data. VCO switch circuit consists of three transistors Q17, Q18, Q19 which select VCO by control signal from CPU.
- d. The back up circuit backs up CPU by IC-10 when DC supply is connected. When DC supply is removed, super capacitor C58 (1 Farad) backs up CPU until its voltage drops to 3 volts, or approximately one week.

2.2.3 CPU-LCD Board Assembly:

- a. This assembly consists of CPU, key board and LCD display. The CPU is a one-chip 4-bit microprocessor including 4-bit parallel process ALU, ROM, RAM, I/O port, 8 bit serial interface, 8 bit programmable counter and LCD controller/driver. It has many features: ROM capacity of 4096 x 8 bit; RAM capacity of 224 x 4 bit; direct drive LCD; low voltage data save, RC oscillator for system clock, crystal oscillator; single power supply, low current drain, etc. MX7000 has an additional chip IC-2. The CPU accepts 4 signals and outputs 6 signals as follows, and drives the LCD display.

Control signal inputs to CPU:

1. Squelch signal from IC-4 pin 14 in the main board.
2. PLL lock signal Q16 collector in the PLL board.
3. 6 volt signal from IC-7 in the main board.
4. Key lock signal from SW2 lock switch in the CPU, LCD board.

Control signal outputs from CPU:

1. Mode switching signal of AM, NFM, WFM to the mainboard.
 2. VCO switching signal of high/low to the PLL board.
 3. Alarm signal for beep tone to audio amplifier in the mainboard.
 4. 5 kHz switching signal 0/5 kHz in NFM/AM mode to 3rd oscillator in the main board.
 5. Step switching signal 5/12.5 kHz to IC-8 in the PLL board.
 6. PLL data signals of clock (CK), data (DATA) and strobe (STB) to IC-7 in 17 bit binary serial input.
- b. LCD readout displays frequency, channel number, mode, priority, delay, scan, lock out, search, increments, and time.

2.3 Operating Controls and Procedures

See the appropriate Receiver's Owner's Manual for details.

SECTION

3

MAINTENANCE

3.1 General

- a. Maintenance of MX5000 and MC7000 Receivers consists of two principal tasks: alignment and adjustment, and troubleshooting. These procedures require making adjustments and measurements on the PC Board Assemblies (Main, PLL and LCD-CPU).
- b. The following equipment is required:
 1. DC Voltmeter
 2. AC Voltmeter
 3. Oscilloscope (10 MHz)
 4. Frequency Counter (1350 MHz)
 5. Signal Generator (455 kHz-550 MHz)
 6. Spectrum Analyzer (1350 MHz)
 7. Tracking or Sweep Generator (50 MHz)
 8. DC Power Supply (12V, 500 mA)
 9. Special RF probe (constructed by soldering two short pins to BNC female connector) for use with Spectrum Analyzer and Frequency Counter.



3.2 Accessing PC Board Assemblies

- a. Disconnect power.
- b. Remove two screws near front rubber feet at bottom of unit and two screws at rear, attaching lower panel to chassis. Carefully set lower panel next to chassis (NOTE: The wires from the loudspeaker can be disconnected by detaching the plug).
This will expose the PLL Board Assembly and the LCD-CPU Assembly (behind front panel).

- c. Remove two screws at rear, attaching top panel to chassis. Gently lift top panel up and pull back to remove. This will expose the Main Board Assembly and Figure 1-1 for screw locations.
- d. See Figure 3-1 for PC Board Assembly locations.

3.3 Removal of PC Board Assemblies

First get access by following above procedure (Sec. 3.2)

a. Removal of Main PC Board

- (1) Remove all external connections to board.
NOTE: Be careful not to bend or break any pins.
- (2) Detach screws holding board to chassis.

b. Removal of PLL Board

- (1) Tilt unit upside down.
- (2) Remove all external connections to board.
- (3) Detach screws holding board to chassis.

c. Removal of CPU-LCD Board

- (1) Remove all external connections.
- (2) Remove screws attaching board to chassis side.
- (3) Remove screws holding board to chassis main frame.

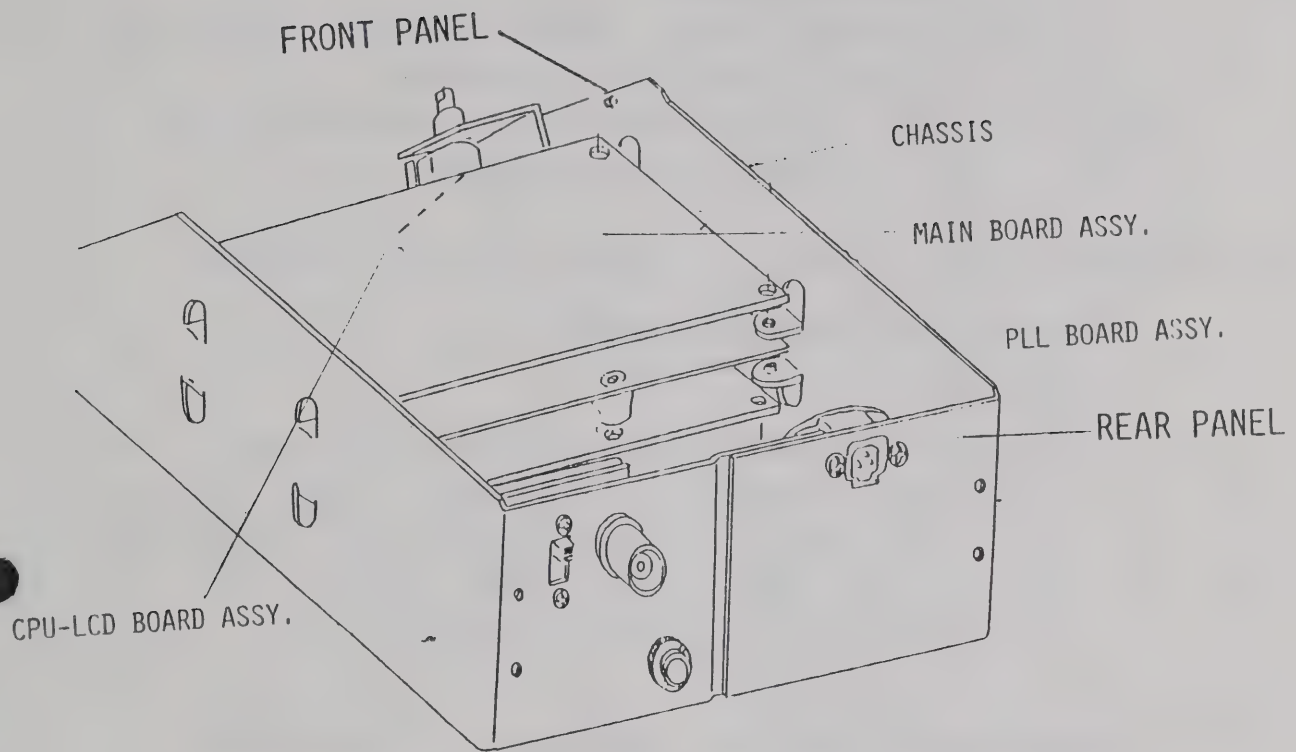
3.4 Re-installing PC Board Assemblies

Reverse disassembly procedures.

3.5 Alignments and Adjustments

While observing procedures, refer to parts placement illustrations as follows:

	<u>MX5000</u>	<u>MX7000</u>
CPU-LCD Board	Figure 3-2	Figure 3-10
PLL Board	Figure 3-3	Figure 3-9
Main Board	Figure 3-4	Figure 3-8



TOP VIEW WITH UPPER PANEL REMOVED

3.5.1 On CPU-LCD Board (Fig. 3-2, MX5000; Fig. 3-10, MX7000):
Clock Timebase Oscillator Alignment

Procedure:

- (1) Set Receiver at 100.000 MHz in any mode (with channel flashing).
- (2) Connect Frequency Counter to TP1. Adjust TC1 to read 512.000 MHz on Counter.

NOTE: Approximately 20 seconds/month tolerance can be obtained.

3.5.2 On PLL Board (Fig. 3-3, MX5000; Fig. 3-9, MX7000):
Reference Oscillator Alignment

Procedure:

- (1) Set Receiver at 550.000 MHz in any mode.
 - (2) Touch Frequency Counter Probe to back terminal of RF output connector (RCA type). Adjust TC1 to read 1300.000 MHz on Counter.
- NOTE: Allow ± 500 Hz tolerance.

3.5.3 On Main Board (Fig. 3-4, MX5000; Fig. 3-8, MX7000):
a. DC 10V Alignment

Procedure:

- (1) Connect DC Voltmeter to pin 5 of IC8.
- (2) Adjust VR3 to obtain a 10V reading.

b. 2nd IF Filter Alignment

Procedure:

- (1) Prepare a short jumper wire with alligator clips. Jumper top of R125 and + side of electrolytic capacitor C136 (the jumper disables AGC on Q36).
- (2) Connect output of Tracking or Sweep Generator to base of Q3, and Spectrum Analyzer input cable to pin 16 of IC4.

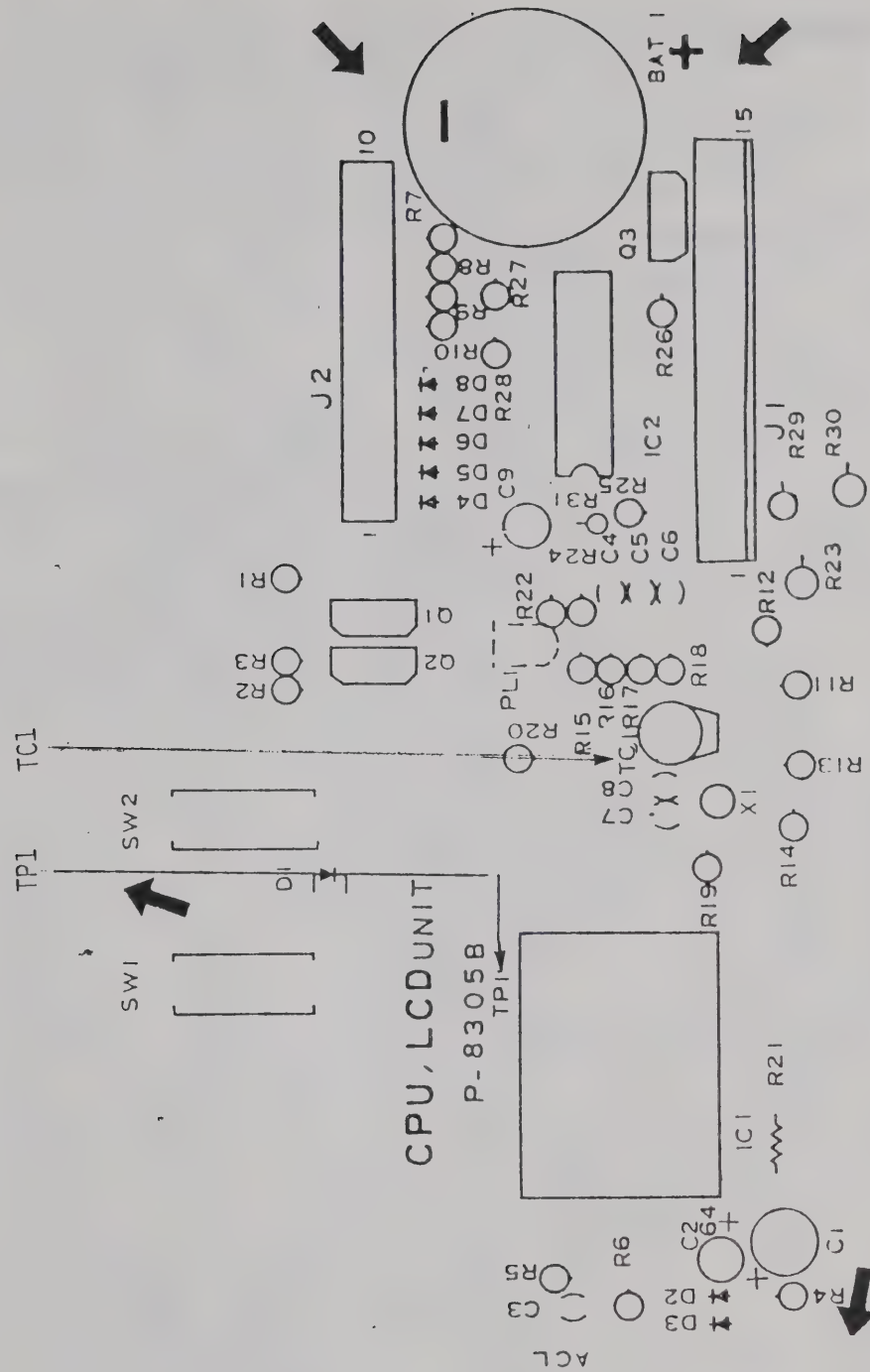


Figure 3-2. Location of Components on MX5000 CPU-LCD Board Called Out in Alignment Procedures

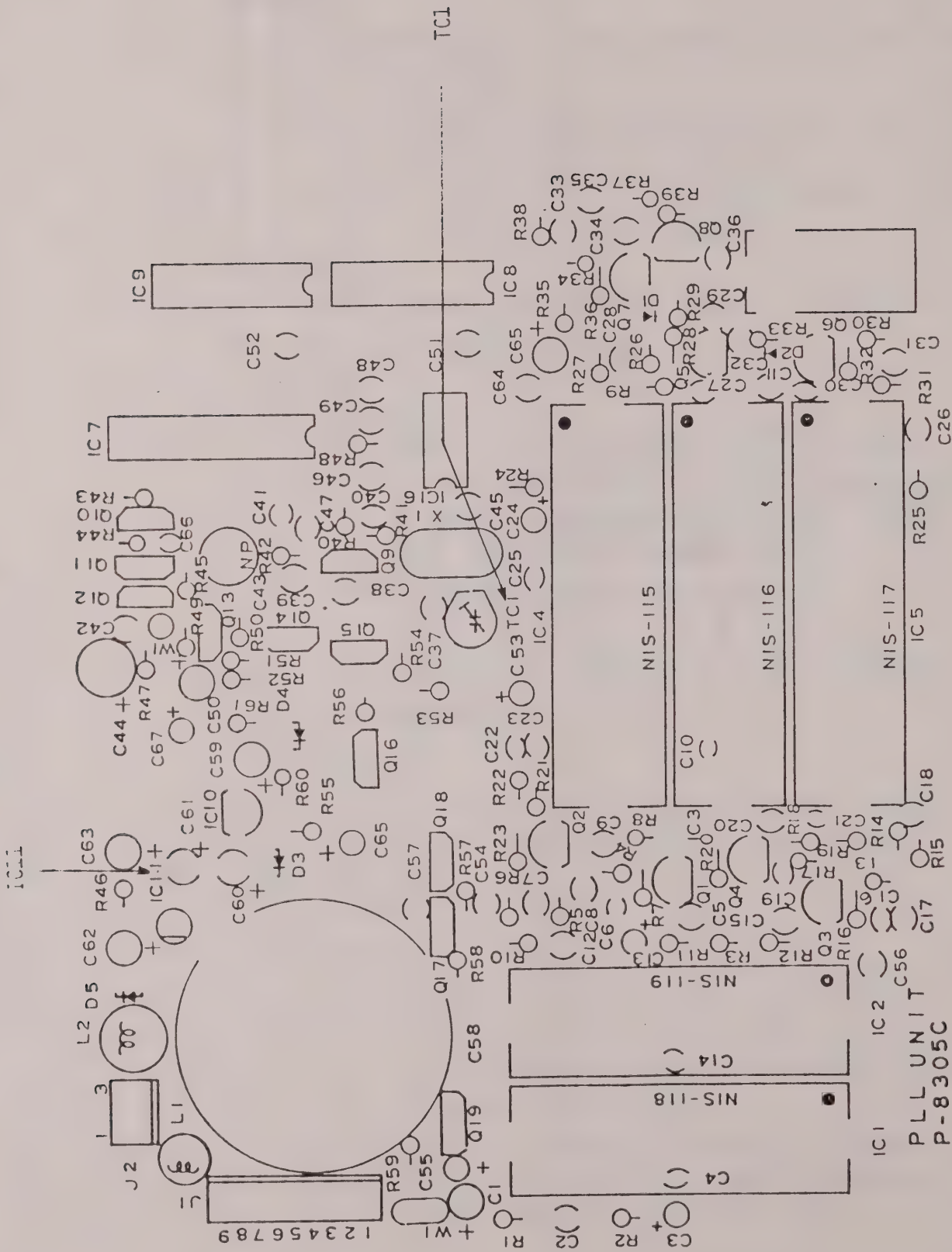
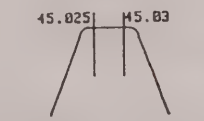


Figure 3- Location of Components on MX5000/MX7000 PLL Board Called Out in Alignment Procedures

- (3) Set Receiver in AM or NFM mode at any frequency. Set Generator output to -40 dBm and Spectrum Analyzer input to 0 dBm (10 kHz/Div.).
- (4) Adjust T4, T5, T6, T7 and T8 to get a response as shown below:



- (5) Shift Spectrum Analyzer connection from pin 16 of IC4 to pin 16 of IC5.
- (6) Set Receiver in WFM mode to any frequency. Change Spectrum Analyzer dispersion to 50 kHz/division.
- (7) Adjust T15, T16, T17 and T18 to get a curve with large amplitude.

c. 2nd Oscillator Alignment

Procedure:

- (1) Connect Spectrum Analyzer probe to base of Q12. Adjust T10, T11 and T12 for peak at 234.99 MHz.
- (2) Shift Analyzer probe to base of Q3. Adjust T12, T13 and T14 for peak at 704.97 MHz.
- (3) Connect Frequency Counter probe to base of Q3. Adjust T3 for an exact reading of 704.970 MHz.
(NOTE: For MX7000, program the Receiver for 550 MHz.)

d. 1st IF Alignment

Procedure:

- (1) Connect Signal Generator output at 225.105 MHz, 1 kHz 60% AM, -80 dBm to Receiver input jack.
- (2) Connect DC Voltmeter to top of R125 (Q36 emitter) and ground.

- (3) Connect DC Voltmeter and Oscilloscope in parallel at speaker terminal (rear panel).
- (4) Set Receiver to 225.105 MHz in AM mode. Adjust volume control (front panel) for distortion-free indication on oscilloscope.
- (5) Adjust T2 and T3 for minimum DC Voltmeter reading.

NOTE: If AGC voltage becomes less than 3 volts, reduce signal generator output and re-adjust T2 and T3.

e. RF Amplifier Alignment

Procedure:

- (1) Connect DC Voltmeter to top of R125 (Q36 emitter) and ground.
- (2) Connect Signal Generator output at 25.105 MHz. Set Receiver frequency to 25.105 MHz.
- (3) Adjust T1 for minimum DC Voltmeter reading.
- (4) Check sensitivity (within ± 2 dB) at any frequency between 25 and 550 MHz.

3.6 Troubleshooting

All procedures are performed on the Main Board (Figure 3-5) except as noted. Table 3-1 lists symptoms and troubleshooting procedures to correct the situation. Refer to the relevant illustrations indicated in the last column.

Table 3-1. Troubleshooting Chart.

Notes: 1. For equipment required, see Sec. 3.1 2. PC Boards are on MX5000.		
SYMPTOM/PROBLEM	ACTION/SOLUTION	REFERENCE
1. Defective reception in any three modes	<u>On Main Board</u>	
	a. Check voltage at pins 3 and 4 of J4 connector	Fig. 3-5
	b. Check voltage at W3 on AM; at W4 on NFM and pin 4 of IC5 on WFM.	
	c. Check with an Oscilloscope output from each detector.	
2. No sound, except beep when keying in any mode.	<u>On Main Board</u>	
	a. Check voltage at D10 and D11	Fig. 3-5
	b. Check Volume Control wiring	
	<u>On CPU-LCD Board</u>	
	c. Check leakage of C9.	Fig. 3-6
3. Low Sensitivity	<u>On Main Board</u>	
	a. Check IC1. Add 100k ohm resistor and 1SS97 diode at pin 6 (if none exist).	Fig. 3-5
	<u>On PLL Board</u>	
	b. Check output level and frequency of first oscillator.	Fig. 3-7
	<u>On Main Board</u>	
	c. Check frequency and output level of second oscillator (704.97 MHz)	Fig. 3-5
4. Low Sensitivity in 25-230 MHz or 230-550 MHz range.	<u>On PLL Board</u>	
	a. Check IC1 for low band and IC2 for high band	Fig. 3-7
	b. Determine voltage for low and high line voltages.	
	c. Measure RF voltages and waveforms using signal generator and oscilloscope.	

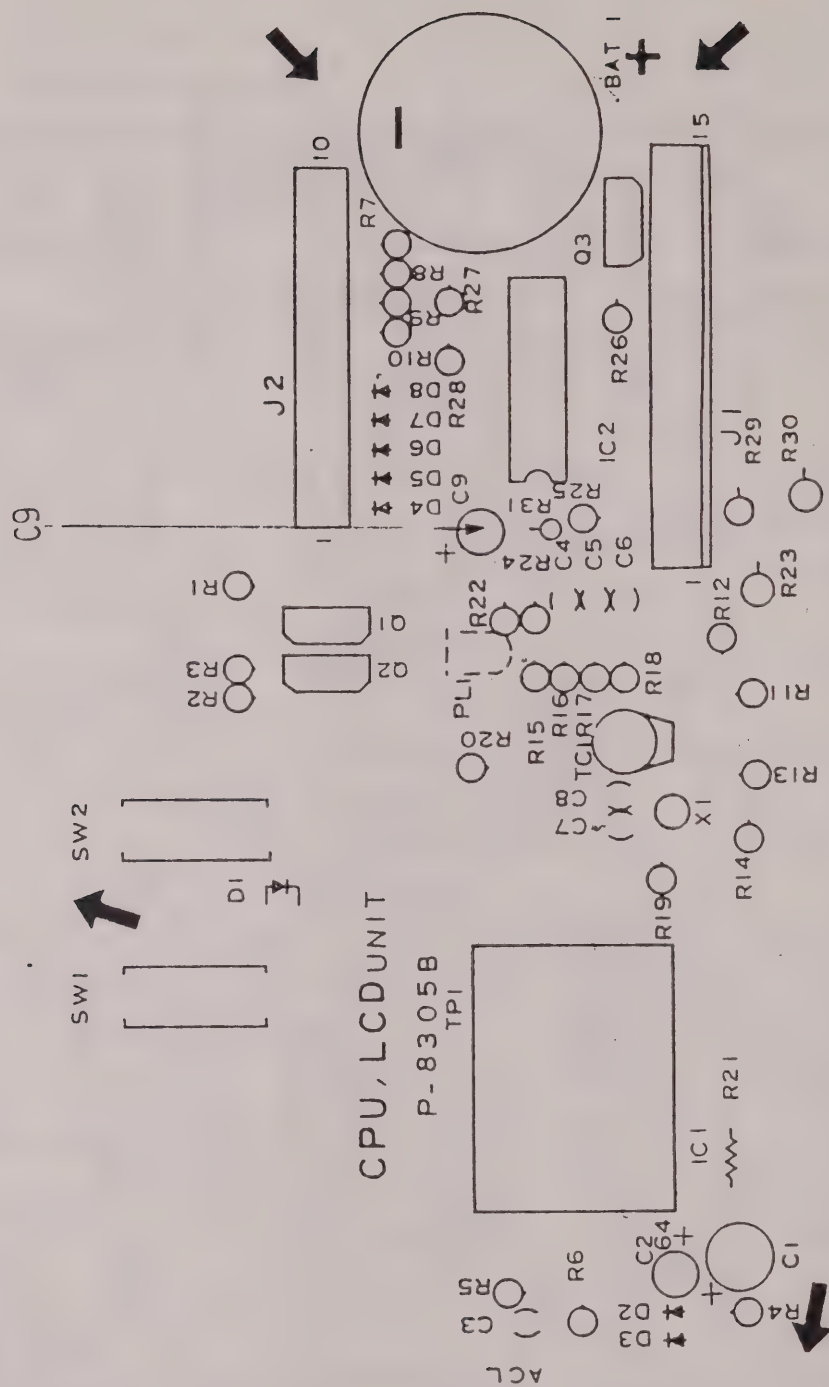


Figure 3-6. Location of Components on MX5000 CPU-LCD Board
Referred in Troubleshooting Procedures

Table 3-1. Troubleshooting Chart. continued

5. No sound or fixed display or display shows channel number but no frequency	<p><u>On PLL Board</u></p> <p>a. Ground Q16 base. See if display changes.</p> <p>b. Set Receiver in SCAN mode. Check signals at pin 1 (STB), pin 6 (DATA) and pin 7 (CLK) of IC11.</p> <p>c. Measure voltage at pin 3 of IC11 (VCV). If low, check with oscilloscope whether 5 kHz or 6.25 kHz appears on pin 2 of IC7. If high (20 volts), check RF signal on pin 2 of IC6 using an RF Voltmeter.</p> <p>d. Using Spectrum Analyzer, determine if VCO is properly oscillating</p>	Fig. 3-7
6. Unlock on Special frequencies or random frequencies.	<p><u>On PLL Board</u></p> <p>a. Check pin 2 of IC7 for 5 kHz or 6.25 kHz.</p> <p>b. Measure waveform at pin 5 of IC7.</p> <p>c. Check if IC7 is defective.</p>	Fig. 3-7
7. No response on 5 kHz up or down	<p><u>On Main Board</u></p> <p>a. Check 3rd oscillator for crystal function.</p> <p>b. Check if 44.570 MHz crystal is defective.</p>	Fig. 3-5

Table 3-1. Troubleshooting Chart. continued

8. Microphonic ; NFM Mode	<u>On PLL Board</u> Check VCO (IC1 or TC2). See adhesive tape to wall is enough.	Fig. 3-7
<u>AM Mode</u>	<u>On Main Board</u> a. Check crystal X1 (46.998 MHz) in second oscillator b. See if PCB mounting screws are loose. c. Check solder joints on shield between Main Board and PLL Board.	Fig. 3-5
9. No sound, no beep, no display	<u>On Chassis</u> Check 3A fuse. (To replace fuse, loosen up metal clips with nosepliers, then unscrew holder.)	Fig. 1-1

3.7 Replacement Parts List, MX5000

- a. The following gives the arrangement of replacement parts:

ITEM	PART NO.	TABLE NO.	FIGURE NO.
CPU-LCD Board Assy.		3-2	3-2
PLL Board Assy.		3-3	3-3
Main Board Assy.		3-4	3-4
Others		3-5	

- b. All resistors are carbon film, 1/16 watt, unless noted otherwise.

3.8 Replacement Parts List, MX7000

- a. For parts placement, refer to illustrations as follows:

Board Assy.	Fig. No.
Main	3-10
PLL	3-9
CPU-LCD	3-8

- b. The PLL Board Assembly is identical in components and their layout to the MX5000 Assembly. The Main Board and the CPU-LCD Board Assemblies in MX7000 differ from those in MX5000 in both parts and layout. The differences are minimal for the CPU-LCD Boards.
- c. Complete Parts list for MX7000 is not available at this time but will be added soon. Note, however, that Tables 3-3 and 3-5 are common to MX5000 and MX7000.

Table 3-2. Replacement Parts List, CPU-LCD Board Assy. MX5000(See Fig. 3-2)

ITEM REFERENCE DESIGNATION	PART NUMBER	DESCRIPTION
C1	9999-5000-052	Capacitor, El.; 100uF; 6.3V
C2	9999-0650-053	Capacitor, El.; 1uF; 50V
C3, C8	9999-1000-093	Capacitor, Cd; 33pF; 50V
C4-C6	9999-1000-098	Capacitor, Cd; 0.01uF; 50V
C7	9999-0604-112	Capacitor, Cd; 10pF
C9	9999-1000-114	Capacitor, El.; 0.1uF; 50V
D4-D8	9999-0604-006	Diode, 1S1588
IC1	9999-5000-237	IC; uPD750; 3MB058
R5, R7-R10, R14, R21	9999-5000-287	Resistor, Carbon; 100k ohm
R6	9999-5000-289	Resistor, Carbon; 150K ohm
R12, R13, R20	9999-0750-021	Resistor, Carbon; 10K ohm
R15-R17, R19	9999-0750-031	Resistor, Carbon; 220K ohm
R18	9999-0750-036	Resistor, Carbon; 330K ohm
R22, R25, R30	9999-0750-042	Resistor, Carbon; 47K ohm
R24	9999-5000-271	Resistor, Carbon; 100 ohm
R29	9999-5000-270	Resistor, Carbon; 10 ohm
X1	9999-5000-202	Crystal, 32.768 kHz
	9999-5000-313	Connector, 10-Pin; Male
	9999-5000-404	Screw, 2X8: Qty. 4

Table 3-3. Replacement Parts List, PLL Board Assy. MX5000/MX7000(See Fig. 3-3)

ITEM REFERENCE DESIGNATION	PART NUMBER	DESCRIPTION
C1, C24, C53, C55, C67	9997-1000-064	Capacitor, 4.7uF; 35V
C2, C12, C14, C40-42 C45, C57, C66, C68	9999-1000-098	Capacitor Cd; 0.01uF; 50V
C3, C13, C61	9999-5000-052	Capacitor, El.; 100uF; 6.3V
C4, C7, C8, C11, C17, C18, C20, C22, C25, C26, C28, C31, C35, C46, C48, C51, C52, C54, C56, C64, C72	9999-1000-097	Capacitor, Cd; 0.001uF; 50V
C5, C9, C15, C19, C36	9999-0604-112	Capacitor, Cd; 10pF
C6, C16, C21, C23, C38, C47, C70	9997-0900-086	Capacitor, Cer.; 100pF
C10	9999-0604-111	Capacitor, Cd; 5pF
C27, C34	9999-0604-109	Capacitor, Cd; 2pF
C29, C32	9999-0604-108	Capacitor, Cd; 1pF
C33	9999-0604-110	Capacitor, Cd; 3pF
C37	9999-1000-093	Capacitor, Cd; 33pF; 50V
C39	9999-0604-122	Capacitor, Cd; 470pF
C43	9997-5000-145	Capacitor, El.; 4.7uF; 25V
C49	9999-0604-120	Capacitor, Cd; 220pF
C50	9999-0650-051	Capacitor, El.; 0.22uF; 50V
C58	9999-5000-051	Capacitor, El.; 1F; 5.5V
C59	9999-1000-052	Capacitor, El.; 100uF 10V
C60, C62, C63	9999-0650-053	Capacitor, El.; 1uF; 50V
C65	9999-0650-054	Capacitor, El.; 10uF; 16V
C71	9999-5000-050	Capacitor, Chip; 10pF
C73	9999-1000-090	Capacitor, Cd; 7pF; 50V
D1, D2	9999-5000-251	Diode; BA282
D3-D5	9999-0604-006	Diode, 1S1588
D6	9999-5000-252	Diode, Zener; DRD24EP

Table 3-3. Continued

ITEM REFERENCE DESIGNATION	PART NUMBER	DESCRIPTION
IC1	9999-5000-228	IC; NIS-118
IC2	9999-5000-229	IC; NIS-119
IC3	9999-5000-226	IC; NIS-116
IC4	9999-5000-225	IC; NIS-115
IC5	9999-5000-227	IC; NIS-117
IC6	9999-5000-230	IC; UP8-563
IC7	9999-5000-231	IC; UPD3805-03
IC8	9999-5000-232	IC; TC-4011BP
IC9	9999-5000-233	IC; TC-15026BF
IC10	9999-5000-234	IC; UA78L62AC
IC11	9999-5000-235	IC; TCA-720
IC12	9999-5000-236	IC; UPC1651C
L1	9999-5000-167	Inductor, 220 UHy
L2	9999-5000-166	Inductor, 2.2 UHy
Q1-Q8	9999-5000-260	Transistor; 2SC3355
Q9	9999-5000-262	Transistor; 2SC2787
Q10-Q12, Q14, Q15	9999-5000-261	Transistor; 2SC2785
Q13, Q17, Q18	9999-5000-263	Transistor; 2SA1175
R1, R10, R42	9999-0750-041	Resistor, Carbon; 4.7K ohm
R2, R3, R5, R6, R9, R11, R12, R14, R15, R18, R19, R21, R22, R24-R27, R30, R31, R35, R38, R61	9999-5000-271	Resistor, Carbon; 100 ohm
R4, R13, R34, R37	9999-5000-272	Resistor, Carbon; 47 ohm
R7, R16, R20, R23, R28, R32, R36, R39	9999-0750-035	Resistor, Carbon; 33K ohm
R8, R17	9999-5000-270	Resistor, Carbon; 10 ohm
R29, R33, R40, R54, R62	9999-0750-020	Resistor, Carbon; 1K ohm

Table 3-3. Continued

ITEM REFERENCE DESIGNATION	PART NUMBER	DESCRIPTION
R41, R49-R51, R55, R56, R59	9999-0750-042	Resistor, Carbon; 47K ohm
R43, R45	9999-0750-026	Resistor, Carbon; 150 ohm
R44	9999-5000-288	Resistor, Carbon; 120K ohm
R46	9999-0750-025	Resistor, Carbon; 1.2K ohm
R47, R57, R58,	9999-0750-021	Resistor, Carbon; 10K ohm
R48	9999-0750-031	Resistor, Carbon; 220K ohm
R53, R63	9999-5000-283	Resistor, Carbon; 22K ohm
R60	9999-0750-036	Resistor, Carbon; 330K ohm
TC1	9999-1000-046	Trimmer, Ceramic; 20pF
X1	9999-5000-201	Crystal, 32.768 kHz
	9999-5000-312	Connector, 9-Pin; Male
	9999-5000-320	Jack, Female
	9999-5000-510	Shield-Case (A)
	9999-5000-511	Shield-Case (B)

Table 3-4. Replacement Parts List, Main Board Assembly, MX5000 (See Fig. 3-4)

ITEM REFERENCE DESIGNATION	PART NUMBER	DESCRIPTION
C1, C2, C85, C86, C90	9999-1000-094	Capacitor, Cd; 47pF; 50V
C4, C6, C137	9999-0604-108	Capacitor, Cd; 1pF
C5, C9	9999-1000-090	Capacitor, Cd; 7pF; 50V
C7, C11, C56, C83 C129	9999-0604-111	Capacitor, Cd; 5pF
C8, C13, C14, C16, C22, C23, C28, C29, C30, C32, C35, C40, C55, C58, C64, C70, C72, C75, C76, C79, C89, C92, C130, C132, C138, C139	9999-1000-097	Capacitor, Cd; 0.001uF; 50V
C10, C59, C61	9999-0604-112	Capacitor, Cd; 10pF
C12, C15, C50, C52, C54	9999-0604-114	Capacitor, Cd; 15pF
C17, C39, C41, C42, C62, C71, C84, C97 C106, C109, C112, C124, C131, C133	9999-1000-098	Capacitor, Cd; 0.01uF; 50V
C18, C20, C135	9999-0604-109	Capacitor, Cd; 2pF
C19	9999-0604-110	Capacitor, Cd; 3pF
C21, C24-C26, C31, C44, C60, C63, C65, C66, C69, C73, C78	9999-5000-055	Capacitor, Ceramic; 20pF
C27, C88	9999-1000-093	Capacitor, Cd; 33pF; 50V
C33	9999-1000-100	Capacitor, El.; 2.2uF; 50V
C34, C36, C46, C48, C94, C98, C102, C104, C108, C113, C127	9999-1000-114	Capacitor, El.; 0.1uF; 50V
C37-C39	9999-0650-054	Capacitor, El.; 10uF; 16V
C43, C51, C77	9999-5000-056	Capacitor, Ceramic; 24pF
C45, C49, C87	9997-0900-086	Capacitor, Ceramic; 100pF
C47	9999-1000-096	Capacitor, Cd; 150pF; 50V
C53, C67, C68	9999-1000-089	Capacitor, Cd; 0.5pF; 50V

Table 3-4. Continued

ITEM REFERENCE DESIGNATION	PART NUMBER	DESCRIPTION
C57	9999-0604-113	Capacitor, Cd; 12pF
C80, C81, C91, C96, C100, C101	9999-5000-058	Capacitor, Ceramic; 0.022uF
C82	9999-1000-092	Capacitor, Cd; 27pF
C95, C99, C103, C107, C116, C125	9999-0650-053	Capacitor, El.; 1uF; 50V
C105	9999-5000-057	Capacitor, Ceramic; 0.0047uF
C114, C121	9999-5000-052	Capacitor, El.; 100uF; 6.3V
C115	9999-0650-055	Capacitor, El.; 220uF; 16V
C122, C136	9999-1000-052	Capacitor, El.; 100uF; 10V
C123	9997-1000-064	Capacitor, 4.7uF; 35V
C126	9997-5000-148	Capacitor, El.; 100uF; 16V
D1, D6-D11, D14-D17	9999-0604-006	Diode, 1S1588
D2, D3	9999-5000-251	Diode, BA282
D4, D5	9997-0900-025	Diode, 1S2588
D13	9999-5000-253	Diode, 48701-3P
D18	9999-5000-254	Diode, ISS97
IC1	9999-5000-238	IC; MC5800
IC2	9999-5000-239	IC; NIS-110A
IC3	9999-5000-240	IC; NIS-112A
IC4, IC5	3130-3193-524	IC (IF); MC3357
IC6	9999-5000-243	IC; TC-4066BP
IC7	9999-5000-241	IC; UA7806; 500MA
IC8	9999-5000-242	IC; UPC2002
L1-L3	9999-5000-156	Coil, RF; 03876
L5	9999-5000-157	Coil, RF; 03877
Q1	9999-1000-070	Transistor, FET; 3SK121

Table 3-4. Continued

ITEM REFERENCE DESIGNATION	PART NUMBER	DESCRIPTION
Q2, C6, Q9, Q17, Q18, Q20, C21, Q25, Q26, Q28, Q29, Q34-Q36, Q38	9999-5000-261	Transistor; 2SC2785
Q3, Q12, Q13, Q37	9999-5000-260	Transistor; 2SC3355
Q4, Q5, Q8, Q14-Q16	9999-5000-262	Transistor; 2SC2787
Q7, Q22, Q24, Q27, Q33	9999-5000-263	Transistor; 2SA1175
Q10, Q11	9999-5000-266	Transistor; 2SC2786
Q19	9999-5000-264	Transistor; 2SK68
Q32	9999-5000-265	Transistor; 2SD288
R1, R5, R131, R138	9999-5000-271	Resistor, Carbon; 47 ohm
R2, R3, R44, R46, R75, R144	9999-5000-287	Resistor, Carbon; 100K ohm
R4, R68, R115, R125, R134	9999-5000-270	Resistor, Carbon; 10 ohm
R6, R7, R18, R24, R74, R84, R101, R119, R120, R126, R146	9999-0750-042	Resistor, Carbon; 47K ohm
R8, R145	9999-5000-272	Resistor, Carbon; 47 ohm
R9, R13, R14, R16, R38, R41, R45, R47, R50, R51, R53, R54, R64, R71, R78, R137	9999-0750-020	Resistor, Carbon; 1K ohm
R10, R11, R37, R58, R59, R66, R69, R77, R79, R93, R94, R96, R99, R100, R102, R105 R122, R124, R129, R135, R142	9999-0750-021	Resistor, Carbon; 10K ohm
R12, R20, R22, R29, R48, R72, R82, R83, R90, R104	9999-0750-041	Resistor, Carbon; 4.7K ohm

Table 3-4. Continued

ITEM REFERENCE DESIGNATION	PART NUMBER	DESCRIPTION
R15, R21, R26, R28, R30, R36, R39, R42, R49, R52, R57, R63, R65, R67, R87, R98, R121, R143	9999-0750-031	Resistor, Carbon; 220K ohm
R17, R31, R55	9999-5000-282	Resistor, Carbon; 18K ohm
R23	9999-5000-290	Resistor, Carbon; 470K ohm
R25, R35, R85	9999-5000-276	Resistor, Carbon; 1.5K ohm
R27, R29, R139	9999-5000-281	Resistor, Carbon; 15K ohm
R32, R33, R40, R56, R91	9999-5000-277	Resistor, Carbon; 2.2K ohm
R34, R60	9999-5000-285	Resistor, Carbon; 56K ohm
R43, R81	9999-5000-274	Resistor, Carbon; 220 ohm
R61	9999-0750-025	Resistor, Carbon; 1.2K ohm
R62, R108	9999-5000-278	Resistor, Carbon; 3.3K ohm
R70, R109	9999-5000-279	Resistor, Carbon; 5.6K ohm
R73, R95, R97, R106, R107, R136	9999-5000-283	Resistor, Carbon; 22K ohm
R76	9999-5000-280	Resistor, Carbon; 6.8K ohm
R80, R132	9999-5000-286	Resistor, Carbon; 68K ohm
R86	9999-5000-284	Resistor, Carbon; 27K ohm
R89, R92, R104	9999-5000-275	Resistor, Carbon; 470 ohm
R103, R123	9999-5000-292	Resistor, Carbon; 3.3 ohm
R110	9999-5000-291	Resistor, Carbon; 0.33 ohm
R127, R128, R130	9999-0750-035	Resistor, Carbon; 33K ohm
R141	4704-0100-032	Resistor, Carbon; 10 ohm
T1, T4-T8, T15-T18	9999-5000-150	Coil, RF; 01436
T2	9999-5000-155	Coil, RF; 03988
T3	9999-5000-153	Coil, RF; 03748
T9	9999-5000-154	Coil, RF; 03875
T10-T12	9999-5000-151	Coil, RF; 02670
T13, T14	9999-5000-152	Coil, RF; 03747
T19, T20	9999-5000-161	Coil; DBM

Table 3-4. Continued

ITEM REFERENCE DESIGNATION	PART NUMBER	DESCRIPTION
TCZ	9999-1000-046	Trimmer, Ceramic; 20pF
VR3	9999-5000-296	Variable Resistor, 10K
X1	9999-5000-203	Crystal, 46.998 MHz
X2	9999-5000-204	Crystal, 44.575 MHz
X3	9999-5000-205	Crystal, 44.570 MHz
X4	9999-5000-206	Crystal, 39.530 MHz
	9999-5000-315	Connector, 2-Pin; Male
	9999-5000-316	Connector, 3-Pin; Male
	9999-5000-317	Connector, 6-Pin; Male; Qty 2
	9999-5000-318	Connector, 7-Pin; Male
	9999-5000-213	Discriminator; CDA5.5MD2
	9999-5000-214	Discriminator; CDB455C7
	9999-5000-210	Filter, MCF; 45M16B
	9999-5000-211	Filter, SFT; 5.5MA
	9999-5000-212	Filter, DFU; 455F
	9999-5000-351	Insulator, Mylar; Qty. 2
	9999-5000-321	Jack, Female

Table 3-5. Replacement Parts List, Miscellaneous, MX5000/MX7000.

ITEM REFERENCE DESIGNATION	PART NUMBER	DESCRIPTION
	<u>STANDARD ACCESSORIES</u>	
	9014-1479-900	DC Power Cord (MA-534)
	9014-1480-000	AC Charger, Wallmount (MA-535)
	9014-1480-100	Telescopic Antenna with BNC Connector (MA-536)
	9014-1480-200	Mobile Mounting Bracket with Hardware (MA-537)
	<u>OTHER ITEMS</u>	
	9999-5000-505	Case, Front
	9999-5000-506	Case, Upper (Upper Panel)
	9999-5000-507	Case, Lower (Lower Panel)
	9999-5000-520	Chassis
	9999-5000-326	Connector, BNC with Mounting Hardware
	9999-5000-327	Connector, DC
	9999-5000-328	Connector, 3.5MM
	9999-5000-329	Connector, 2-Pin
	9999-5000-330	Connector, 4-Pin
	9999-5000-314	Connector, 15-Pin; Male; Keyboard
	9999-5000-431	Feet, Rubber; Qty. 4
	9999-5000-308	Fuse, 3A
	9999-5000-432	Grommet; Qty. 2
	9999-5000-306	Keyboard
	9999-5000-435	Knob, Big
	9999-5000-436	Knob, Small
	9999-5000-307	Lamp; PQ031-20403A
	9999-5000-441	Lens, LCD Window
	9999-5000-426	Nut 30; Qty. 2
	9999-5000-501	Panel, Front; Embossed
	9999-5000-503	Panel, Back
	9999-5000-323	Plug; Qty. 2
	9999-5000-401	Screw; 2X4; BHMS; Qty. 4
	9999-5000-402	Screw; 2X6; BHMS; Qty. 2

Table 3-5. Continued

ITEM REFERENCE DESIGNATION	PART NUMBER	DESCRIPTION
	9999-5000-403	Screw; 2.6X5; BHMS; Qty. 13
	9999-5000-404	Screw; 2X8; BHMS; Qty. 4
	9999-5000-405	Screw; 2.6X10; BHMS
	9999-5000-406	Screw; 3X5; BHSMS; Qty. 4; For Shield Mounting
	9999-5000-407	Screw; 3X8; BHSMS; Qty. 2; For Transistor Mounting
	9999-5000-408	Screw; 3X10; BHSMS; Qty. 4; For Feet Mounting
	9999-5000-409	Screw; 2.6X10; BHSMS; Qty. 2
	9999-5000-410	Screw, Mounting
	9999-5000-512	Shield, Plate; Attenuator
	9999-5000-513	Shield, PLL/Case
	9999-5000-514	Shield, Antenna
	9999-5000-309	Speaker; SM-66NR
	9999-5000-433	Spring-PLL; Qty. 2
	9999-5000-202	Switch, Panel
	9999-5000-301	Switch; SP104; Qty. 2
	9999-5000-302	Switch, SST
	9999-5000-350	Tape, Aluminum; 15mmX80mm
	9999-5000-420	Washer, Ext. Lock; Qty. 2
	9999-5000-421	Washer, Fiber

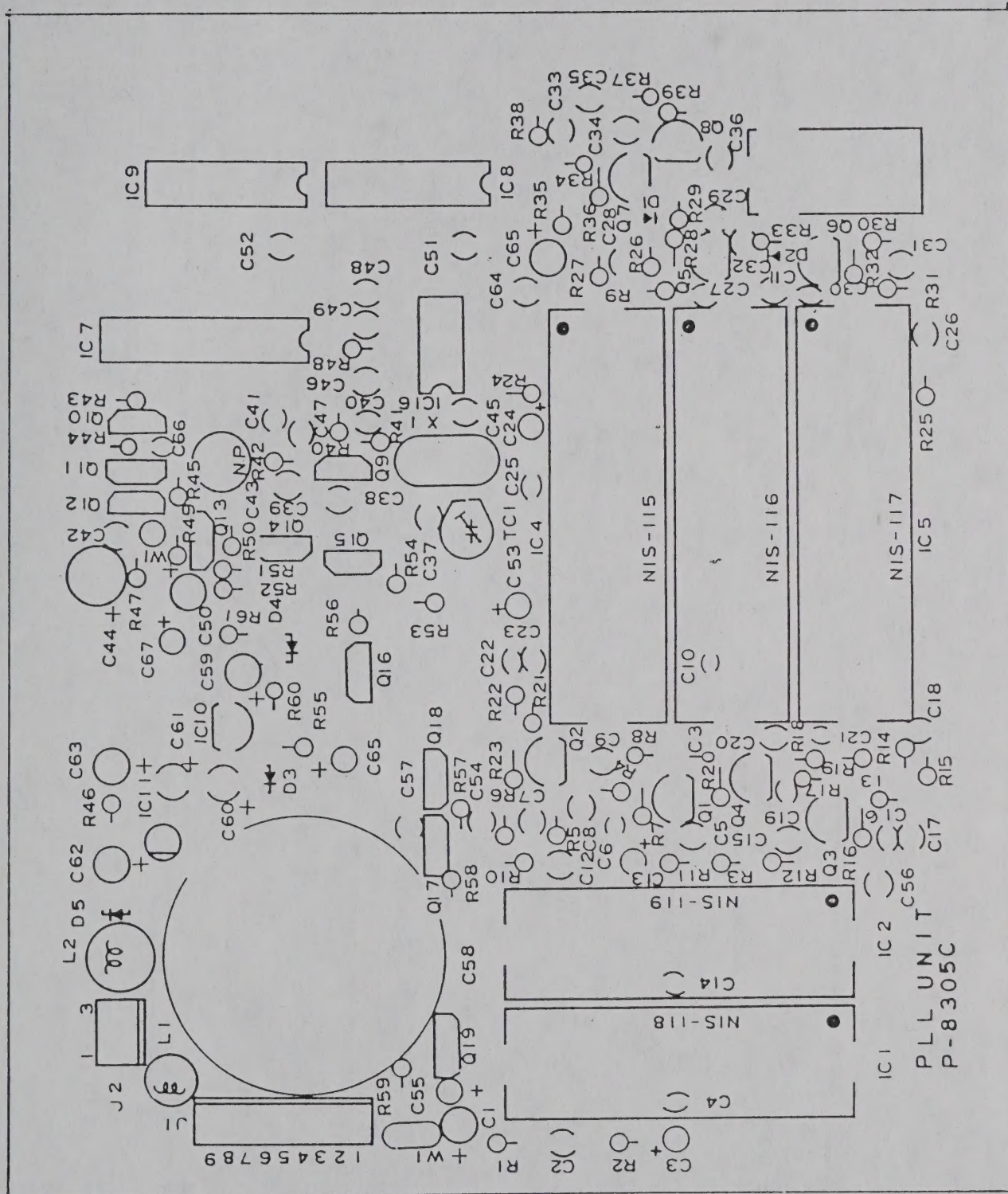


Figure 3-9. Parts Placement Diagram, PLL Board, MX7000

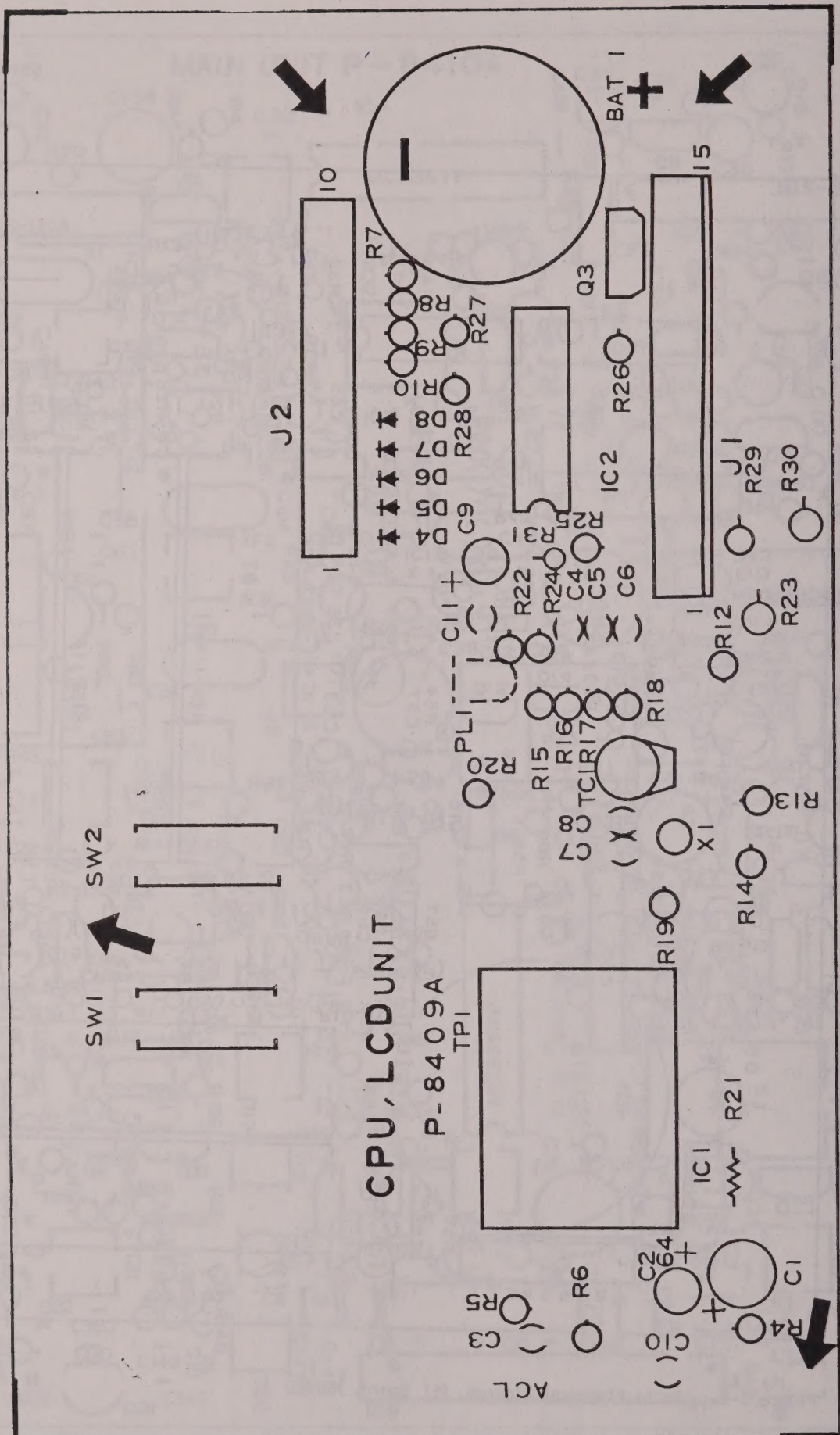


Figure 3-10. Parts Placement Diagram, CPU-LCD Board, MX7000 .

